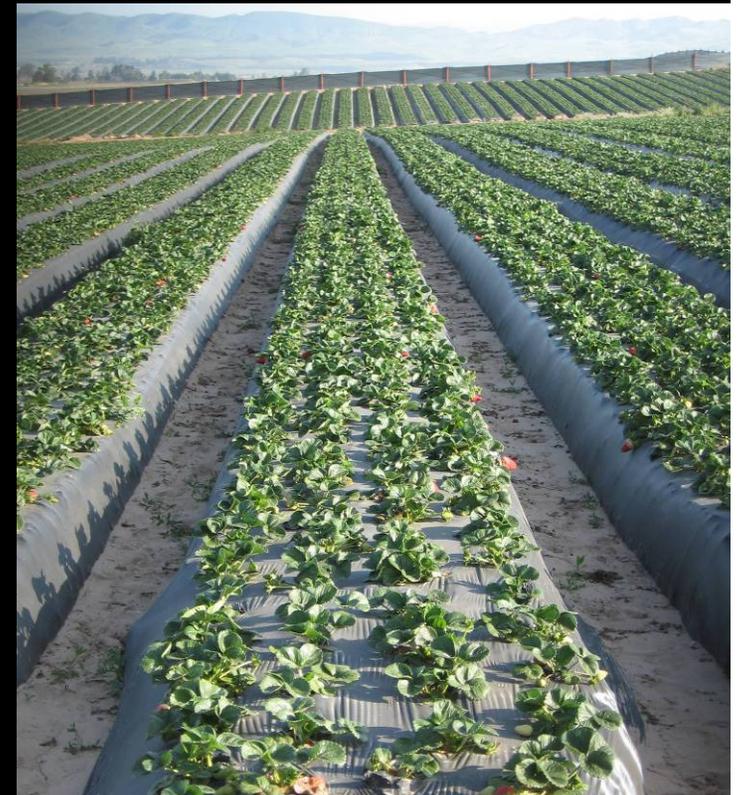
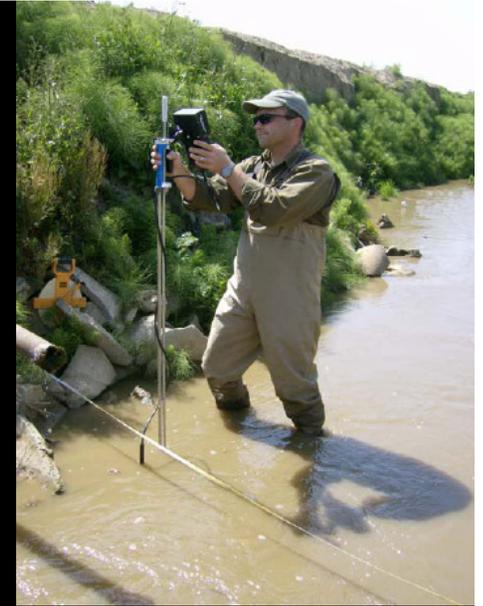


Nitrate concentration vs. load :



Nitrate concentration vs. load :

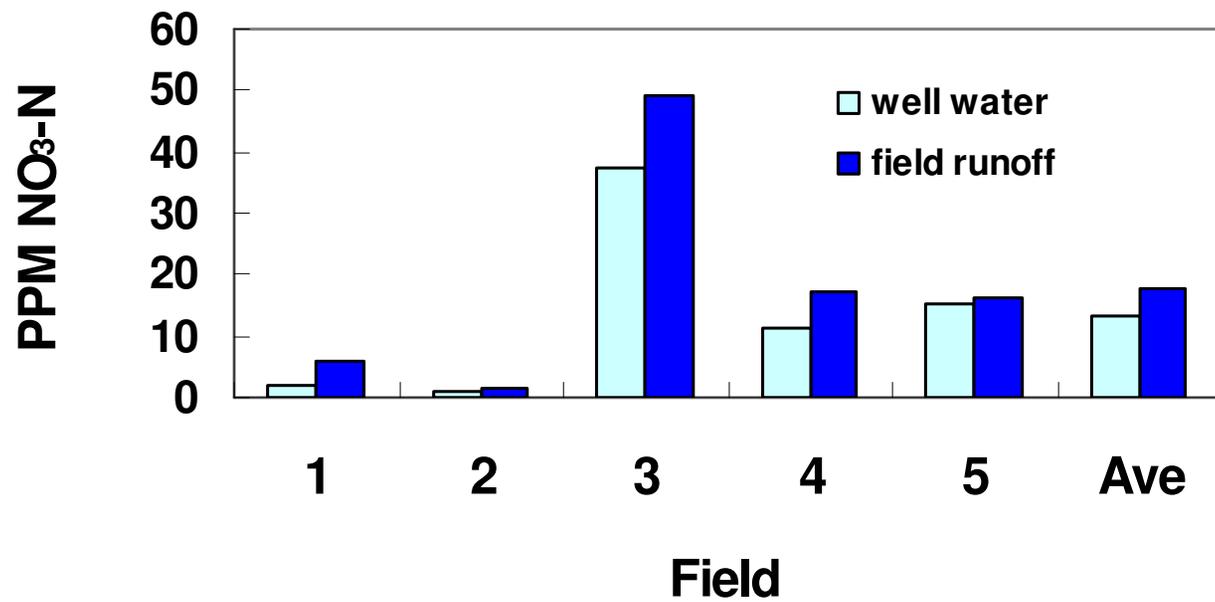
- ✓ **Management options that growers have to address the nitrate problem (primarily irrigation upgrades and fertilizer rate reduction) can reduce nitrate *loading*, but may not produce an equivalent reduction in surface water nitrate *concentration***
- ✓ **Focusing on nitrate *concentration* of surface water, particularly in creeks and drains comprised mostly of irrigation runoff and ag drainage, may miss significant reduction in nitrogen *loading***



Practical limitations on reducing surface water nitrate concentration :

- ✓ much of the nitrate in irrigation runoff is from the well water
- ✓ there is no on-farm practice to consistently remove nitrate in runoff

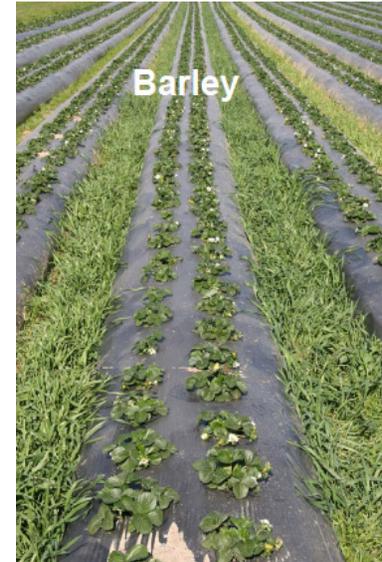




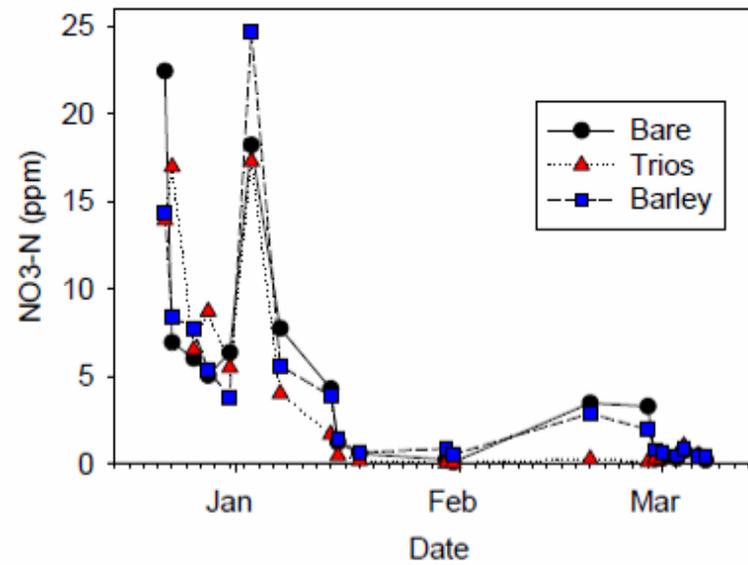




| | Runoff NO ₃ -N (PPM) | |
|-----------------|---------------------------------|------|
| | 2007 | 2008 |
| Bare ditch | 2 | 6 |
| Vegetated ditch | 2 | 7 |



Nitrate Conc. of Run-off





Practical limitations on reducing surface water nitrate concentration:

- ✓ **Surface water influenced by root zone solution will be persistently high, because root zone nitrate must be persistently high**
- ✓ **Salinity control requires some water movement out of the root zone**

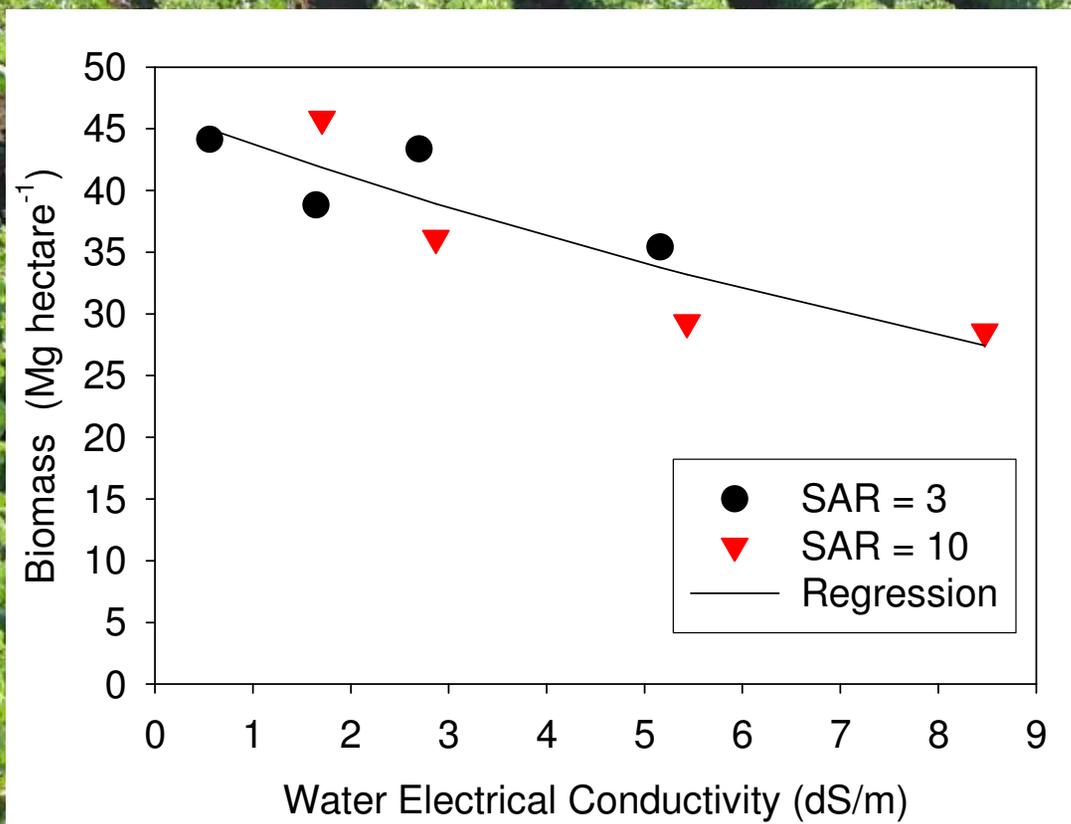


Lettuce example:

- **Requires uptake of ≈ 120 lb N/acre to achieve maximum yield**
- **Transpires ≈ 8 inches of water over the season**
- **Since most N uptake occurs with transpiration, and most uptake is in the nitrate form, the average $\text{NO}_3\text{-N}$ concentration of root zone soil water must be greater than 50 PPM**

Salinity control requires some discharge from the root zone :

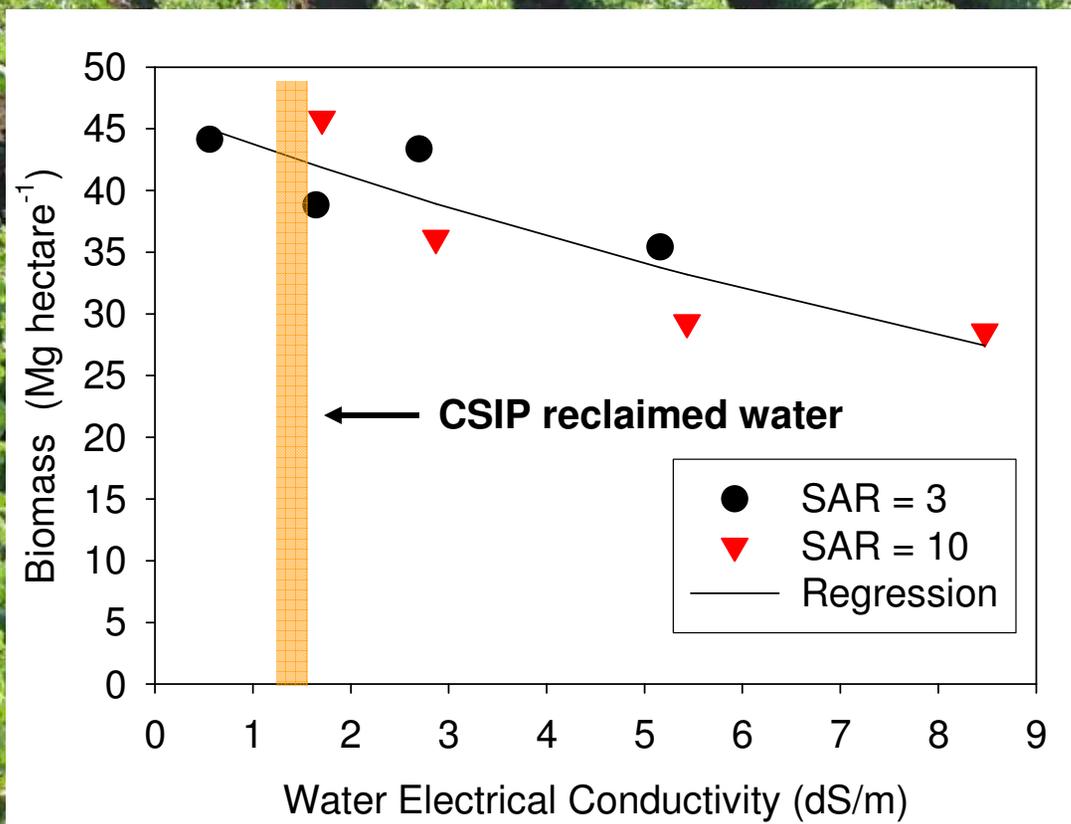
Lettuce growth is affected by soil salinity



Strawberry is even more salt sensitive

Salinity control requires some discharge from the root zone :

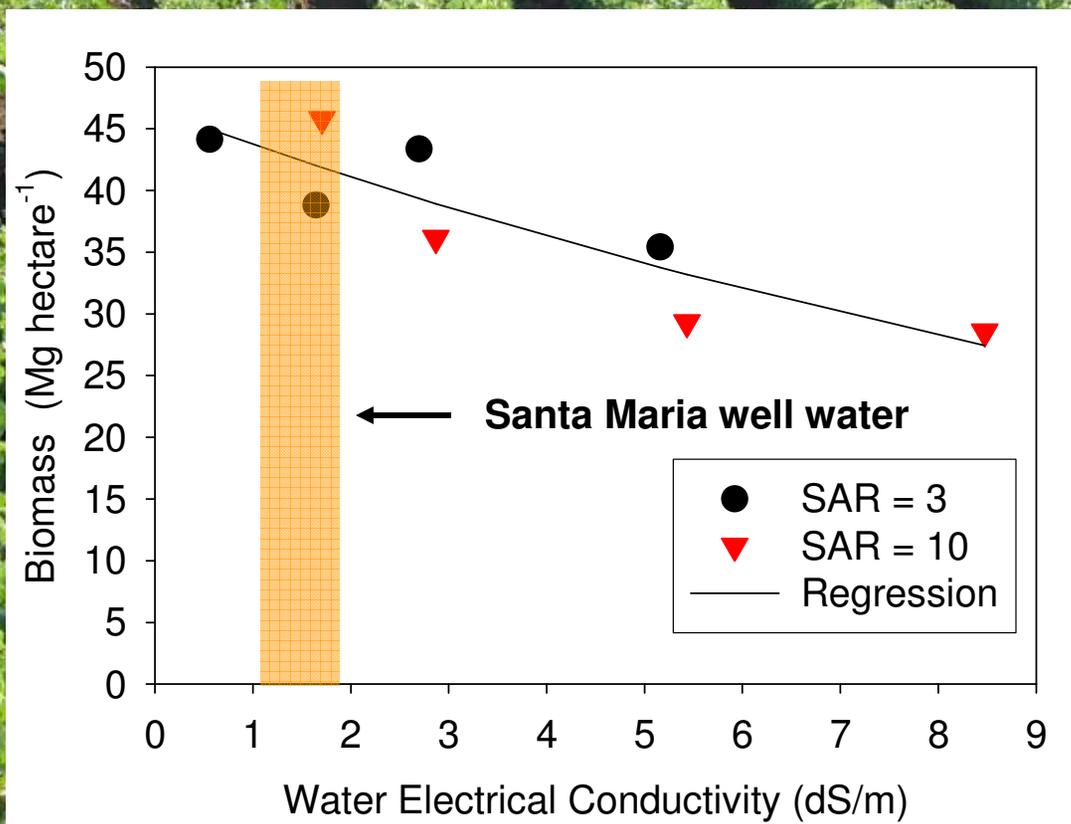
Lettuce growth is affected by soil salinity



Strawberry is even more salt sensitive

Salinity control requires some discharge from the root zone :

Lettuce growth is affected by soil salinity



Strawberry is even more salt sensitive

In summary ...

- Growers can reduce nitrate loading through irrigation and fertilizer management, but meeting a concentration standard in all water discharges is impossible
- Using nitrate concentration as the sole focus of monitoring may undervalue agronomic improvements



